

REMARKS

Claims 11, 12, 14 and 20 are rejected, under 35 U.S.C. § 103(a), as being unpatentable over Bonne '447. The Applicant acknowledges and respectfully traverses the raised obviousness rejection in view of the above amendments and the following remarks.

As the Examiner is aware in order to support an obviousness rejection under 35 U.S.C. §103(a), the cited reference must provide some motivation to one of ordinary skill in the art or provide some specific suggestion that would lead one of ordinary skill in the art to achieve the presently claimed invention. Page 3 of the Official Action notes, "Bonne discloses a method for continuous measurement of thermal conductivity of a fluid . . .". While this may be true, there is no express or implicit disclosure teaching or suggestion in the applied reference relevant to a *multi-functional fluid*.

Beyond whatever is disclosed in Bonne '447, it is an important aspect of the present invention that, as discussed in paragraphs 4-7, that the present method is for the measurement of the thermal conductivity of a multi-functional fluid. As noted in the Applicant's specification at paragraph [007] "A multi-function fluid is a fluid which can be comprised of several components which can be in different phases, liquid, solid or gaseous. A simple example of a multi-functional fluid is blood. Other multi-functional fluids are, for example, biphasic mixtures consisting of phase change materials, currently called PCMs, in suspension in a liquid and an ice slurry."

The Applicant's present invention advances the art well beyond the known simple gaseous fluid measurement apparatus and methods as disclosed in Bonne '447, "[t]he present invention concerns a method for the continuous measurement of the thermal conductivity of a *multi-functional fluid* in which an increase in temperature of the sample of *multi-functional fluid* is generated and this increase in temperature is measured." Specification Paragraph[004] Where the known methods can be effectively utilized only with single-phase fluids for example

a gas fuel as in Bonne '447, it is an important and different aspect of the present invention to obtain such measurements in multi-functional fluids which can be bi-phasic and therefore particularly more difficult to obtain a useful thermal conductivity measurement.

As noted in paragraphs 012 and 013 of the Applicant's specification:

For simple fluids, without a phase change, methods for the measurement of thermal conductivity already exist.

In order to characterize a multi-functional fluid with or without a change of phase, practically no direct, reliable method of measuring thermal conductivity exists.

In other words, the problems inherent in merely measuring simple fluids characteristics such as disclosed in Bonne '447 and the specific apparatus and methods of measurement disclosed therein are exactly what the present invention is intended to overcome.

A thorough review of Bonne '447 fails to reveal any characteristic type fluid other than a simple gaseous fuel fluid for which particular parameters, such as viscosity, thermal conductivity, specific heat and optical absorption are measured. Thus, in accordance with the above cited paragraphs of the Applicant's specification, it is the Applicant's initial contention that the Bonne '447 reference, and the particular references incorporated therein, for example at column 10, lines 57 and 64 relating to the FIGS. 4-8 of Bonne '447, in fact teach specifically away from this aspect of the present invention. The apparatus and method disclosed in these reference are entirely incompatible with respect to a "multi-functional fluid". For example as shown in FIG. 2, and at col. 9 lines 36-39, Bonne '447 utilizes a series of blocking screens 54 which are intended to separate and isolate a fluid gas sample from the gas flow so as to minimize fluid flow effects.

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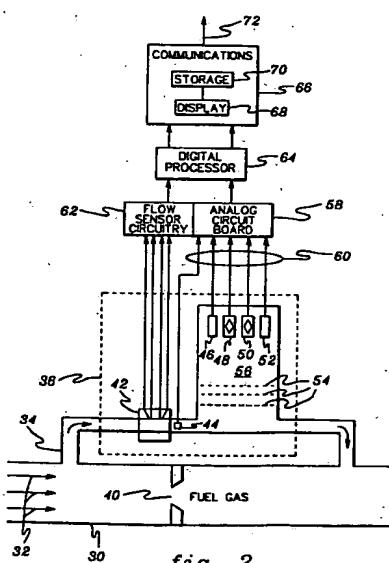


fig. 2

Such an apparatus and method is completely incompatible with multi-functional fluids for instance bi-phasic fluids where a solid phase constituent of the fluid could not pass through the screen.

The Applicant's claim 11 specifically recites "A method for continuous measurement of thermal conductivity of a multi-functional fluid, the method comprising the steps of . . .". While the term "multi-functional fluid" is initially recited not only in the preamble, but also in the body of the claim, the Applicant believes that this multi-functional fluid is a critical aspect of the present invention towards which the invention is explicitly directed. Thus, as this aspect of the present invention is not disclosed, taught or suggested in any manner by the prior art, and in view of the Applicant's stated difficulties in measuring such multi-functional and multi-phasic fluid as described in the present application, the Applicant does not believe there is any of the necessary disclosure, teaching or suggestions in the cited reference to render the presently pending claims obvious. '447.

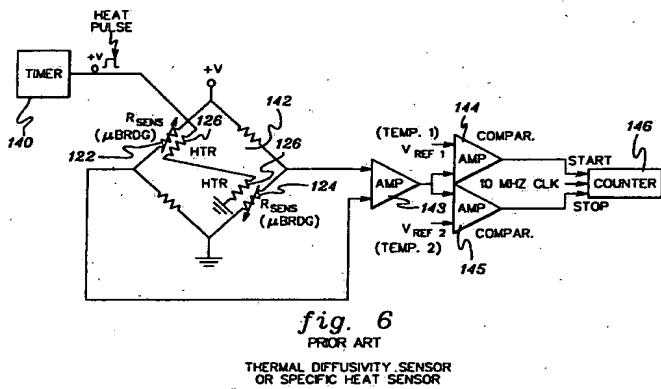
The Official Action contends that Bonne '447 renders obvious the specific step of the present invention of "measuring the temperature increase in at least three separated points within the sample . . .". The Examiner notes on page 3 of the Official Action that Bonne '447 discloses ". . . the evolution of temperature as determined at the three separated points within the sample" (see FIGS. 2, 4A-4C and 5; column 9, lines 5-8; 61 and column 12, lines 7-33). As discussed above, the Applicant has made a thorough study of Bonne '447 and can find no such disclosure, suggestion as required under a test for obviousness that three (3) separated points within the sample are tested.

Observing FIG. 2, and column 9, lines 58-61, a plurality of sensors 46, 48, 50 and 52, are used in Bonne '44, however there is only one temperature sensor at one location in the fluid, 7 "...sensor 46 comprises a pressure sensor; sensor 48, a gas temperature sensor; sensor 50, a thorough conductivity sensor; sensor 52, a viscosity sensor". Thus, although it may be

arguably there are separate sensors deployed throughout the fluid sink 56, as shown in FIG. 2, these are entirely different sensors and are not all directed to "measuring the temperature increase in at least three separated points within the sample" as specifically recited in claim 11.

With respect to the Examiner's indication that it would be obvious of ordinary skill in the art at the time the invention to modify the method of Bonne '447 by creating the thermogram using the three temperatures, the Applicant takes issue with this, in particular in view of the FIGS. 4A-8, none of which disclose three (3) separate temperature sensing separated points, as specifically claimed in the present invention.

In particular, the Applicant observes that FIGS. 4A-7A disclose the particular structure and function of a prior art sensing system utilizing the properties of a Wheatstone bridge 142.



As is particularly well known in the art, a Wheatstone bridge depends upon the balancing of voltages across opposing arms, and therefore, as seen in FIG. 6 above, there are two (2) sensors 124, 126 on opposing arms of the bridge. Such a Wheatstone bridge however does not readily dispose itself to the use of three (3) sensors because of the voltage balance which must be maintained across the Wheatstone bridge. Thus, if anything, the use of such a Wheatstone bridge, as shown in FIGS. 6 and 7 and as apparently contemplated in FIGS. 4A-

4C, in Bonne '447 including the use of three (3) bridges would be practically if not theoretically impossible.

Based on the above arguments, the Applicant takes issue with the fact that claim 11 is rendered obvious based on the "mere duplication" of essential working parts of a device. The present invention recites features in all of the independent claims including critical structure and function going far beyond a mere duplication of sensors in both a structural and functional aspect. Thus, the obviousness rejection requires more substantive disclosure leading one of skill in the art to achieve the present invention. The Federal Circuit has long held that, "[T]he mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification." *In re Laskowski*, 10 USPQ 1397, 1398, (Fed. Cir. 1989), citing *In re Gordon*, 221 USPQ 1125, 1127 (Fed. Cir. 1984). As there is no such disclosure, suggestion or teaching of the Applicant's specifically recited features in claim 11, as required by case law, in the applied reference the Applicant respectfully requests withdrawal of the obviousness rejections.

The Applicant thanks the Examiner for indicating that claims 15-19 are objected to as being dependent on a rejected base claim, but would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims. Accordingly, claims 14 is amended to include the subject matter of claim 19 and thus claim 14, and claims 15-18 dependent thereon are now also believed to be allowable.

Additionally, in accordance with the Examiner's indication of allowable subject matter from page 6 of the Official Action, the Applicant has added new claims 21-23 which although substantially similar to claim 11 as discussed above, new independent claim 21 includes the specific subject matter relative to the determination of the temperature evolution of the multi-functional fluid as a function of time in accordance with temperature measurements from at least three temperature probes.

If any further amendment to this application is believed necessary to advance prosecution and place this case in allowable form, the Examiner is courteously solicited to contact the undersigned representative of the Applicant to discuss the same.

In view of the above amendments and remarks, it is respectfully submitted that all of the raised obviousness rejections should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejection(s) or applicability of the Bonne '447 reference, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

In view of the foregoing, it is respectfully submitted that the raised rejection(s) should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objection(s) or requirement(s), as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

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In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,



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